AP 2JW

Docket No.: 95-535

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	
	:	
LEE *et al.*	:	
	:	
Serial No.: 10/612,954	:	Group Art Unit: 2618
	:	
Filed: July 7, 2003	:	Examiner: HAROON, Adeel

For: OPTIMAL INITIAL GAIN SELECTION FOR WIRELESS RECEIVER

MAIL STOP: <u>APPEAL BRIEF – PATENTS</u>
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

<u>AMENDED APPEAL BRIEF UNDER 37 CFR §41.37(d)</u>

Sir:

In response to the Notice of Non-Compliant Appeal Brief mailed September 15, 2006, Appellant submits this Amended Appeal Brief under 37 C.F.R. §41.37(d) that includes the Headings IX and X. This Amended Appeal Brief is submitted within one month from the mailing date of the Notice of Non-Compliant Appeal Brief.

This is an appeal from the final rejection of claims 1-7 in the above-identified patent application.

1. <u>Real Party in Interest</u>:

This application is assigned to Advanced Micro Devices, Inc., the real party of interest.

2. <u>Related Appeals and Interferences</u>:

There are no other appeals or interferences known to Appellant that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

3. Status of Claims:

Claims 1-7 are pending in this application. Claims 1-7 stand rejected by the Examiner, and claims 1-7 are appealed.

4. Status of any Amendment File Subsequent to Final Rejection:

An Amendment Under 37 CFR §1.116 was filed on May 11, 2006 in response to the Final Rejection. The June 2, 2006 Advisory Action indicated that the Amendment filed on May 11, 2006 would be entered.

5. Summary of Claimed Subject Matter:

The claimed subject matter includes independent claims 1 and 4 and dependent claims 2-3 and 5-7. Independent claims 1 and 4 each specify a wireless transceiver (50 of Fig. 1) having an input circuit (analog-to-digital (A/D) converter within the analog front end (AFE) amplifier 40 of Fig. 1): the input circuit has a prescribed input range (e.g., page 6, lines 16-18, 24-26 and 33-34). Since the claimed input circuit has a prescribed input range, the specification describes that any received wireless signal should be amplified at an optimum gain (GAIN 102 of Fig. 2) to match the prescribed input range (e.g., page 6, lines 16-18; page 7, lines 31-33). The specification also describes that the gain of the AFE amplifier 40 is controlled by a digital automatic gain controller (55 of Figs. 1 and 2; page 4, lines 6-9).

Hence, independent claims 1 and 4 each specify determining the optimum gain (GAIN 102 of Fig. 2) for the received wireless signal (P_{IN} 100 of Fig. 2). For example, the specification describes (and claim 4 recites) a digital gain controller (55 of Figs. 1 and 2) configured for determining an optimum gain (GAIN 102 of Fig. 2) for the received wireless signal (100 of Fig. 2, page 6, lines 16-18; page 7, lines 31-33). Each of the independent claims 1 and 4 specify

determining the optimum gain (GAIN 102 of Fig. 2) relative to either an initial gain value, or a minimum gain value.

In particular, claims 1 and 4 specify setting a gain (G 104 of Fig. 2) to an initial gain value (initial gain selector 114 of Fig. 2 initially sets $G = G_{INIT}$, steps 200, 202 of Fig. 3, page 6, lines 22-26 and page 6, line 28 to page 7, lines 3-6): the received wireless signal (P_{IN}100) is amplified by the initial gain value ($G = G_{INIT}$) to a first power value (P_1 106 of Fig. 2) (e.g., by amplifier 110 of Fig. 2 in step 202 of Fig. 3, page 6, lines 26-31, page 7, lines 27-28).

A determination is then made whether the first power value (P_1 106), created by amplifying received wireless signal (P_{IN}100) by the initial gain value ($G = G_{INIT}$), exceeds the prescribed input range (saturation detector 112 of Fig. 2 determines in step 204 of Fig. 3 if saturation is detected, page 7, lines 10-20 and 28-30). If saturation is not detected (steps 204 and 208 of Fig. 3), indicating the first power value (P_1 106) does not exceed the prescribed input range, the optimum gain (GAIN 102) is determined relative to the initial gain value ($G = G_{INIT}$) and the first power value (P_1 106) (gain calculator 116 calculates GAIN 102 in steps 204 and 208 based on P_1 106 amplified by G_{INIT}, page 8, lines 1-3).

If, however, the first power value (P_1 106) exceeds the prescribed input range (saturation detector 112 of Fig. 2 detects saturation in step 204 of Fig. 3, page 7, lines 10-11 and 27-29), the optimum gain is determined based on setting the gain to a minimum gain value (saturation detector 112 of Fig. 2 outputs a flag 115 causing gain selector 114 to reset gain G to minimum G_{MIN} ($G = G_{MIN}$), amplifier 110 outputs New Amplified Signal P_1 106 based on minimum gain G_{MIN}, gain calculator 116 computes optimum gain GAIN 102 based on New Amplified Signal 106 amplified by minimum gain G_{MIN}, steps 204, 206, 208 of Fig. 3, page 7, lines 10-20 and 27-33).

Hence, claim 1 specifies a method in a wireless transceiver (50 of Fig. 1), the method including: setting a gain (G 104 of Fig. 2) to an initial gain value ($G = G_{INIT}$, steps 200 and 202 of Fig. 3) for mapping a received wireless signal (P_{IN} 100) to a first power value (P_1 106) for supply of the received wireless signal to an input circuit (A/D) having a prescribed input range (page 6, lines 16-18 and page 6, line 22 to page 7, line 6; page 7, lines 31-33); amplifying (step 202 by

amplifier 110) the received wireless signal by the initial gain value to the first power value (page 6, lines 26-31; page 7, lines 27-28); if the first power value of the received wireless signal does not exceed the prescribed input range (step 204 by saturation detector 112, page 7, lines 10-20 and 28-30, page 8, lines 1-3), determining an optimum gain (GAIN 102) for the received wireless signal relative to the initial gain value and the first power value (step 208 by gain calculator 116, page 8, lines 1-3); if the first power value of the received wireless signal exceeds the prescribed input range (step 204 by saturation detector 112, page 7, lines 10-11 and 27-79), determining the optimum gain for the received wireless signal based on setting the gain to a minimum gain value (step 204 by saturation detector 112 outputting flag 115, step 206 ($G=G_{MIN}$) by gain selector 114 and New Amplified Signal 106 by amplifier 110, step 208 by gain calculator 116 using New Amplified Signal 106, page 7, lines 10-20 and 27-33); and outputting the received wireless signal at the optimum gain (amplifier in AFE 40 amplifies input signal based on GAIN 102 and outputs to A/D, page 4, lines 7-9; page 6, lines 16-18; page 7, lines 30-33).

Dependent claim 2 adds to the method of claim 1, wherein the setting step includes setting the initial gain value based on a dynamic range of the wireless transceiver and based on a prescribed signal to noise ratio (step 200 of Fig. 3, page 6, line 28 to page 7, line 6; page 7, lines 21-26).

Dependent claim 3 adds to the method of claim 2, wherein the dynamic range includes a maximum analog gain supplied by an analog front end amplifier (G_{ANALOG}, page 7, line 1), and a maximum range for the gain (page 6, lines 31-32, range of received wireless signal P_{IN} 100 illustrated as "-90dBm to -30dBm").

Independent claim 4 specifies a wireless transceiver (50 of Fig. 1). The wireless transceiver includes an input circuit (A/D of AFE 40) having a prescribed input range (page 6, lines 16-18, 24-26 and 33-34), and a digital gain controller (55 of Figs. 1 and 2). The digital gain controller is configured for amplifying a received wireless signal (P_{IN} 100 of Fig. 2) to an optimum gain value for the prescribed input range (page 4, lines 6-9) by: (1) setting a gain (G 104 of Fig. 2) to an initial gain value ($G = G_{INIT}$, steps 200 and 202 of Fig. 3) for mapping the received wireless signal to a first power value (P_1 106) for supply of the received wireless signal

to the input circuit (page 6, lines 16-18 and page 6, line 22 to page 7, line 6; page 7, lines 31-33), (2) amplifying the received wireless signal by the initial gain value to the first power value (step 202 by amplifier 110, page 6, lines 26-31; page 7, lines 27-28), (3) if the first power value of the received wireless signal does not exceed the prescribed input range (step 204 by saturation detector 112, page 7, lines 10-20 and 28-30, page 8, lines 1-3), determining an optimum gain (GAIN 102) for the received wireless signal relative to the initial gain value and the first power value (step 208 by gain calculator 116, page 8, lines 1-3), and (4) if the first power value of the received wireless signal exceeds the prescribed input range (step 204 by saturation detector 112, page 7, lines 10-11 and 27-79), determining the optimum gain for the received wireless signal based on setting the gain to a minimum gain value (step 204 by saturation detector 112 outputting flag 115, step 206 ($G=G_{MIN}$) by gain selector 114 and New Amplified Signal 106 by amplifier 110, step 208 by gain calculator 116 using New Amplified Signal 106, page 7, lines 10-20 and 27-33).

Dependent claim 5 adds to the wireless transceiver of claim 4, wherein the digital gain controller is configured for setting the initial gain value based on a dynamic range of the wireless transceiver and based on a prescribed signal to noise ratio (step 200 of Fig. 3, page 6, line 28 to page 7, line 6; page 7, lines 21-26).

Dependent claim 6 adds to the wireless transceiver of claim 5, further comprising an analog front end amplifier (40) configured for amplifying the received wireless signal by up to a maximum analog gain (G_{ANALOG}, page 7, line 1) and outputting the received wireless signal to the digital gain controller (Fig. 1 illustrates AFE 40 output to AGC 55), wherein the dynamic range includes the maximum analog gain and a maximum range for the gain (page 6, lines 31 to page 7, line 2, range of received wireless signal P_{IN} 100 illustrated as "-90dBm to -30dBm", maximum G_{ANALOG} = 35 dB, resulting in 95dB).

Dependent claim 7 adds to the wireless transceiver of claim 6, wherein the wireless transceiver is configured as an Orthogonal Frequency Division Multiplexing (OFDM) receiver configured for receiving the received wireless signal according to IEEE 802.11a protocol (page 3, line 28 to page 4, line 6).

6. Grounds of Rejection to be Reviewed on Appeal:

A. Whether claims 1 and 4 are unpatentable under 35 U.S.C. §102(b) as having been anticipated in view of U.S. Patent No. 5,917,865 to Kopmeiners et al.

7. Arguments:

A. Claims 1 and 4 are not anticipated 35 U.S.C. §102(b) in view of Kopmeiners et al.

In the Final Office Action, the Examiner rejected independent claims 1 and 4 under 35 USC §102(b) in view of Kopmeiners et al. Claims 1 and 4 are neither anticipated nor rendered obvious by Kopmeiners et al. for the following reasons.

A1. Claims 1 and 4 Require Determining the Optimum Gain Relative to the Single Initial Gain Value and the First Power Value if the First Power Value Does Not Exceed the Threshold

Each of the independent claims 1 and 4 specify an arrangement for determining an optimum gain for a received wireless signal. The received wireless signal is amplified by an initial gain value (G_{INIT}) to a first power value: the initial gain value is set for supply of the received wireless signal to an input circuit having a prescribed input range.

Each of the independent claims 1 and 4 also explicitly specify a logical procedure for determining an optimum gain value for the prescribed input range, in which there are only two possible gain settings for determining the optimum gain, depending on the first power value that is generated by amplifying the received wireless signal by the initial gain value:

[1] "if *the first power value* of the received wireless signal ***does not*** exceed the prescribed input range, the optimum gain is determined relative to the initial gain value and the first power value" (referred to herein as the "initial gain mode"); and

[2] "if *the first power value* of the received wireless signal ***does*** exceed the prescribed

input range, the optimum gain is determined based on setting the gain to a minimum gain value ("minimum gain mode").

Hence, the first power value is evaluated to determine whether it exceeds the prescribed input range, and the "if the first power value of the received wireless signal does not exceed the prescribed input range," then the claims explicitly specify "determining the optimum gain for the received wireless signal ***relative to the initial gain value and the first power value***". However, "if the first power value of the received wireless signal exceeds the prescribed input range," where the very same power value ("***the*** first power value") exceeds the prescribed input range, then the claims specify "determining the optimum gain for the received wireless signal based on ***setting the gain*** to ***a minimum gain value***."

Hence, if the first power value does not exceed the prescribed input range, the explicit claim language requires "determining the optimum gain" with no further change in the amplification of the received wireless signal, because the claims specify determining the optimum gain "relative to the initial gain value and ***the first power value***." In other words, the recital of "the first power value" in singular form (as opposed to the plural "value*s*") requires that the optimum gain must be able to be determined from a single power value, namely the first power value generated by amplifying the received wireless signal by the initial gain value.

However, if the first power value *does* exceed the prescribed input range, the explicit claim language explicitly requires "***setting the gain*** to a ***minimum gain value***" in order to perform the "determining the optimum gain". (This case of the "minimum gain mode" is discussed in more detail *infra.* at Section A.3).

As described in the specification with respect to Figs. 2 and 3, the gain calculator 116 determines the optimum gain in step 208 by calculating the optimum gain based on the existing gain (in this case the initial gain value) and the first power value if in step 204 the received wireless signal does not exceed the prescribed input range (i.e., there is no saturation of the amplified signal) (see page 8, lines 1-3). In other words, the specification describes that the "determining the optimum gain" is not performed by further changes in amplification of the received wireless signal, **but by computing the optimum gain based on the first power level**

created by amplifying the received wireless signal *at the existing gain*.

Hence, the claimed "determining an optimum gain" cannot be so broadly construed as to encompass additional changes to the gain in amplifying the received wireless signal; rather, the broadest reasonable interpretation, as specified in the explicit claim language[1] and consistent with the specification[2], must be interpreted as determining the optimum gain based on the power ***level*** of the received wireless signal having been amplified ***at the existing gain***.

A2. Kopmeiners et al. Does Not Disclose or Suggest Determining the Optimum Gain Relative to the Single Initial Gain Value and the First Power Value if the First Power Value Does Not Exceed the Threshold

The Examiner has the burden of establishing that Kopmeiners et al. discloses each and every element of the claim such that the identical invention must be shown in as complete detail as is contained in the claim.[3] Further, Further, anticipation cannot be established based on a piecemeal application of the reference, where the Examiner picks and chooses isolated features of the reference in an attempt to synthesize the claimed invention.[4] In other words, it is not

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[1]"All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)."

[2]It is well settled that "claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their 'broadest reasonable interpretation.'" *In re Marosi*, 710 F.2d 799, 802, 218 USPQ 289, 292 (Fed. Cir. 1983)(emphasis in original)).

[3]As specified in MPEP §2131: "'A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference' *Verdegaal Bros. V. Union Oil Co. of California,* 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... 'The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." MPEP 2131 (Rev. 3, Aug. 2005, at p. 2100-76).

[4] "Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984). "Anticipation

sufficient that a single prior art reference discloses each element that is claimed, but the reference also must disclose that the elements are arranged as in the claims under review. *In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990) (citing *Lindemann Maschinenfabrik GmbH*).

The rejection fails to demonstrate that Kopmeiners et al. discloses nor suggests the claimed "if the first power value of the received wireless signal does not exceed the prescribed input range, determining an optimum gain for the received wireless signal relative to the initial gain value and the first power value". In fact, Kopmeiners neither discloses nor suggests this claimed feature.

The rejection cites col. 5, lines 19-24 as a disclosure of "determining if the power of the signal does not exceed the prescribed input range, then determining an optimum gain for the received wireless signal relative to the initial gain and power values". The cited portion, however, does not disclose the claimed "determining the optimum gain ... relative to ***the initial gain value and the first power value***", because col. 5, lines 19-24 specifies that *even if* a peak is within the dynamic range of the ADC 120 (and therefore does not exceed the prescribed input range), the gain is ***still adjusted*** in additional increments:

> If the peak signal is within the dynamic range of ADC 120 (i.e., some output value between the upper and lower limits), ***AGC 130 makes a coarse adjustment of the gain control signal*** of VGA 110 in order to set the output of VGA 110 to approximately the target peak level (Steps 220 et seq.). ***This coarse adjustment will be explained below in greater detail.***

Moreover, the Examiner is providing a tortured interpretation of the reference, because the portion relied on by the Examiner (col. 5, lines 19-24) belies the fact that the reference actually does not specifically disclose determining the optimum gain "relative to the initial gain value and the first power value" in the case "if the first power value ... does not exceed the

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cannot be predicated on teachings in the reference which are vague or based on conjecture." *Studiengesellschaft Kohle mbH v. Dart Industries, Inc.*, 549 F. Supp. 716, 216 USPQ 381 (D. Del. 1982), *aff'd.*, 726 F.2d 724, 220 USPQ 841 (Fed. Cir. 1984).

prescribed input range" for the simple reason that, if the initial gain is insufficient, then the reference teaches that additional gain needs to be supplied:

> The first stage of the algorithm is a search mode in which the gain of VGA 110 is varied rapidly in order to bring the strength of the amplified signal within the dynamic range of ADC 120. During the search phase, peak detector 132 reads the peak signal level during an initial, relatively short time interval using a peak-hold function (Step 205). The sampled peak signal is then read by analyzer 134, which determines whether the peak signal is within the dynamic range of ADC 120 (Step 210). If too much gain is applied, ADC 120 will be driven to its upper limit (saturation). ***If insufficient gain is supplied, ADC 120 will be at its lower limit (i.e., zero signal energy output)***. If the peak signal is within the dynamic range of ADC 120 (i.e., some output value between the upper and lower limits), AGC 130 makes a coarse adjustment of the gain control signal of VGA 110 in order to set the output of VGA 110 to approximately the target peak level (Steps 220 et seq.). This coarse adjustment will be explained below in greater detail.
>
> If the sampled peak signal level initially read by peak detector 132 is ***not within the dynamic range*** of ADC 120, AGC 130 adjusts the gain control signal of VGA 110 according to an established search algorithm (Step 215). The process of sampling the signal peak level using a peak-hold function, determining if it is within the dynamic range of ADC 120, and adjusting gain according to the search algorithm if it is not, ***is repeated until the peak signal level is within the operating range of ADC 120 (i.e., loop through Steps 205, 210 and 215)***.
>
> (Col. 5, lines 8-35)

This quoted portion of Kopmeiners et al. demonstrates that the reference does not disclose the claimed "if the first power value of the received wireless signal ***does not exceed the prescribed input range***, determining an optimum gain for the received wireless signal ***relative to the initial gain value*** and the ***first power value***". Rather, Kopmeiners et al. requires additional adjustment of the gain, *even if the first power value does not exceed the prescribed input range*, because Kopmeiners et al. requires the first power value to be within the dynamic range (i.e., does not exceed the range nor fall below the range) before the "stage of the algorithm" can exit from search mode to coarse mode, where further adjustments to the gain will be made.

As noted by the Examiner on pages 2-3 of the Final Action, in Kopmeiners et al. "the parts of the gain control technique are conducted in a ***loop fashion***" (see para. 2) and has an

"iterative nature" where "the process is looped back". As shown in Figures 2A, 2B, and 3, Kopmeiners et al. repeatedly adjusts the gain at steps 215, 230, and 260 during search, coarse adjust, and fine adjust stages, with repeated iterations to locate an optimum gain.

Moreover, the "search algorithms" in the above quote of Col. 5, lines 8-35 are described by Kopmeiners et al. as either a bisection search (col. 5, lines 36-63) requiring several iterations of gain adjustment (col. 5, lines 58-63), or incremental/decremental steps that are illustrated in Fig. 3 as requiring multiple adjustments to the gain:

> Other search algorithms are also known, including the search algorithm depicted in FIG. 3. FIG. 3 depicts a search algorithm which ***moves through the dynamic range*** of the analog-to-digital converter ***in incremental*** (or decremental) ***steps*** equal to the dynamic range of the receiver, in this instance, 20 dB. ***The search mode ends when the received signal comes within the dynamic range of ADC 120***. When peak detector 132 and analyzer 134 determine that a signal peak has been received that is within the range of ADC 120, analyzer 134 compares the sampled signal peak level with an optimum target peak level. The target peak level may be predetermined by control signals received from control circuitry (not shown) coupled to AGC 130.

(Col. 5, line 64 to col. 6, line 7).

Hence, Kopmeiners et al. cannot disclose or suggest determining an optimum gain from a single power value, based on the first power value not exceeding the prescribed input range.

The Advisory Action asserted that "[t]he examiner repeats his interpretation of the limitation 'determining an optimum gain' as being disclosed by Kopmeiners in Column 5, lines 19-24." This assertion, however, is inconsistent with the Final Rejection, which specifies:

> Kopmeiners et al. also disclose determining if the power of the signal does not exceed the prescribed input range, then determining an optimum gain for the received wireless signal **relative to the initial gain and power values** (Column 5, lines 19-24).

(Final Action, page 4 (re: claim 1) and page 5 (re: claim 4)) (emphasis added). Consequently, the Advisory Action demonstrates a deliberate disregard of the explicit claim language that specifies the optimum gain is determined "***relative to the initial gain value and the first power value***". In fact, the Final Action relies on col. 5, line, lines 19-24 not only for disclosing the naked recital of "determining an optimum gain", but also for disclosing the

claimed "if *the* first power value of the received wireless signal does not exceed the prescribed input range, determining an optimum gain for the received wireless signal ***relative to the initial gain value and the first power value***". As shown above, however, Kopmeiners et al. neither discloses nor suggests determining the optimum gain relative to the initial gain value and the first power value, as claimed.

Further, the Examiner admits in the Advisory Action that Kopmeiners et al. does not explicitly disclose the claimed determining the optimum gain "***relative to the initial gain value and the first power value***" in the case "if the first power value of the received wireless signal does not exceed the prescribed input range", because the Advisory Action states in para. 3 that:

> In Kopmeiners' system, when the power value is out of the input range [including if the first power value does not exceed the prescribed input range], it has two possibilities of either **incrementing** or decrementing the gain by 20dB depending on **if the power was below** or above the input range ....

Hence, the Advisory Action admits that, if the first power value does not exceed the prescribed input range, the optimum gain is not determined "relative to the initial gain value and the first power value", as claimed. Moreover, the reference must be considered in its entirety, and must disclose each and every element as arranged in the claim.

Hence, the §102 rejection should be withdrawn because it fails to demonstrate that the applied reference discloses each and every element of the claim. As specified in MPEP §2131: "'A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference' *Verdegaal Bros. V. Union Oil Co. of California,* 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... 'The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." MPEP 2131 (Rev. 3, Aug. 2005, at p. 2100-76).

Although the claims are interpreted as "open ended" the applied reference must include each and every element in the manner claimed, including the claimed determining an optimum gain from a single power value, namely the first power value, based on the first power value not

exceeding the prescribed input range. [5] Kopmeiners et al. fails to disclose this feature, and any assertions by the Examiner to the contrary are insufficient to overcome the deficiencies in the applied reference. "A prior art patent is a reference only for that which it teaches." *Corning Glass v. Sumitomo Electric*, 9 USPQ2d 1962, 1970 (Fed. Cir. 1989).

For this reason alone the §102 rejection should be withdrawn.

A3. Claims 1 and 4 also require Determining the Optimum Gain Based on Setting the Gain to a Minimum Gain Value, if the First Power Value Exceeds the Threshold

Each of the independent claims 1 and 4 also specify a minimum gain mode, namely "if the first power value of the received wireless signal exceeds the prescribed input range, determining the optimum gain for the received wireless signal based on setting the gain to a minimum gain value".

Hence, if the first power value of the received wireless signal (amplified by the initial gain value) exceeds the prescribed input range, then the optimum gain is determined based on ***setting*** the gain to a ***minimum gain value***, eliminating the necessity for any further change in amplification of the received wireless signal. As described in the specification with respect to Figs. 2 and 3, the gain calculator 116 determines the optimum gain in step 208 by the gain selector 114 setting in step 206 the gain to a minimum ($G=G_{MIN}$), and the amplifier 110 outputting the new amplified signal (P_1) (having been amplified at the new gain ($G=G_{MIN}$)) to the gain calculator 116 (page 7, lines 27-33).

As described above in section A1, the specification describes that the "determining the optimum gain" is <u>not</u> performed by further changes in amplification of the received wireless

[5] "Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, <u>arranged as in the claim</u>." *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984). Hence, it is not sufficient that a single prior art reference discloses each element that is claimed, but the reference <u>also</u> must disclose that the elements <u>are arranged as in the claims under review</u>. *In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990) (citing *Lindemann Maschinenfabrik GmbH*).

signal, **but by computing the optimum gain based on the power level created by amplifying the received wireless signal *at the existing gain*.** Hence, the claimed "determining an optimum gain" <u>cannot</u> be so broadly construed as to encompass <u>additional changes to the gain in amplifying the received wireless signal</u>; rather, the broadest reasonable interpretation, consistent with the specification, must be interpreted as determining the optimum gain based on the power ***level*** of the received wireless signal having been amplified ***at the existing gain***.

Further, the specification describes that the "minimum gain level" is, in fact, a <u>minimum</u> gain value that is to be used for higher power received wireless signals:

> If the saturation detector 112 detects that the first power value 106 exceeds the prescribed input range for the input circuit, indicating the received wireless signal 100 has a high input level, the initial gain selector 114 <u>resets the gain 104 to a minimum gain value (e.g., by setting and outputting a flag (F) 115 to the initial gain selector 114)</u>, enabling the internal calculator 116 to determine the optimum gain 102 ***based on the initial gain selector 114 setting the gain to a minimum gain value (G_{MIN})***. In other words, the internal calculator 116 determines the optimum gain 102 based on whether the received wireless signal 100 has a low input level or a high input level based on the absence or presence of saturation detected by the saturation detector 112, respectively. Consequently, ***the internal calculator 116 is able to initiate computations based on determining that the detected saturation corresponds to a signal having a high input level***, enabling the automatic gain controller to obtain the [desired] gain 102 within two steps, namely within [] about two execution cycles of the state machine.
>
> (Page 7, lines 10-20).

Hence, the broadest reasonable interpretation of "minimum gain value" cannot be inconsistent with the specification, which specifies that the gain is set to a <u>minimum</u> level ($G=G_{MIN}$) in order to initiate optimum gain calculations for a signal determined (based on the first power value exceeding the prescribed input range causing "saturation") to have a <u>high input level</u>.

Nor can the broadest reasonable interpretation of "minimum gain value" be inconsistent with the interpretation those skilled in the art would reach: even Kopmeiners et al. acknowledges that a "minimum gain" refers to a gain setting that has no lower boundary (i.e., a ***"zero gain setting"***):

> In the bisection method, an initial gain ***range*** having a maximum gain and ***a minimum gain*** is established in which it is known the measured signal must be found (e.g., ***zero gain setting*** and maximum gain setting).
>
> (Col. 5, lines 41-44).

Hence, the broadest reasonable interpretation of "minimum gain value" cannot be inconsistent with te specification and Kopmeiners et al., both of which specify "minimum gain" as the lowest gain setting that is to be used <u>by the amplifier</u>.[6]

As described in further detail below, although Kopmeiners et al. recognizes the *existence of* a minimum, Kopmeiners et al. does not disclose ever *setting* the gain to a minimum, as claimed.

A4. Kopmeiners et al. Does Not Disclose Determining the Optimum Gain Based on Setting the Gain to a Minimum Gain Value, if the First Power Value Exceeds the Threshold

Kopmeiners et al. provides no disclosure or suggestion whatsoever of the claimed determining the optimum gain for the received wireless signal, ***based on <u>setting the gain to a minimum gain value</u> if the first power value of the receive wireless signal exceeds the prescribed input range***, as claimed. As admitted by the Examiner, Kopmeiners et al. relies on a "gain control technique [] conducted in a loop fashion" and that in the "iterative nature of Kopmeiners et al.'s system ... the process is looped back to step 205."

The Examiner is applying an unreasonable interpretation of the claimed "determining an

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[6] "During patent examination, the pending claims must be 'given their broadest reasonable interpretation consistent with the specification.'" MPEP §2111 at 2100-46 (Rev. 3, Aug. 2005) (*quoting In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000)).

"The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach." MPEP §2111.01 at 2100-47 (Rev. 3, Aug. 2005) (*citing In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999)).

optimum gain ... based on setting the gain to a minimum gain value" by suggesting that this claimed feature would include repeated iterations of changing the gain of the received wireless signal; as described above, however, such an interpretation would be unreasonable because the claim specifies that the optimum gain is determined "based on ***setting the gain to a minimum gain value***"; hence, any *further* changes in the gain would result in the optimum gain no longer being determined based on "***setting*** the gain to a minimum gain value", rather the optimum gain would now be based on another gain value, and therefore falling outside the scope of the claims. As shown above, the Examiner's interpretation also is inconsistent with the specification and the interpretation of "minimum gain" as interpreted by one skilled in the art (e.g., Kopmeiners et al. at col. 5, lines 41-44)).

Further, the Examiner provides a tortured interpretation of the reference. The Examiner cites col. 2, lines 57-65 and asserts on in the Advisory Action and on page 3 of the Final Action that "by *decrementing* the gain value, Kopmeiners et al. is *setting the gain value* to -20dB, which is clearly the ***minimum gain value of its system***."

This argument has no factual basis, because Kopmeiners et al. describes decrementing in -20dB increments *toward* a minimum, but not setting the gain to a minimum:

> In one embodiment of the present invention, in the search mode, the gain signal adjustment subcircuit adjusts the gain signal as a function of the dynamic range of the digital circuit. In a more specific embodiment, the gain signal adjustment subcircuit **adjusts the gain signal by an amount that at most approximates the dynamic range of the digital circuit**. For example, if the dynamic range of the digital circuit is 20 dB, the gain signal is **adjusted** (either downward or upward) **in steps of approximately 20 dB**.
>
> (Col. 2, lines 57-65). (See also col. 5, line 64 to col. 6, line 7 quoted on page 11 *supra*.)

As quoted above (and on page 11 *supra*), Kopmeiners et al. does not describe the decrementing the gain value by -20dB as a "minimum gain value that is *allowed* in its system", as asserted by the Examiner; in fact, the Examiner's assertion that "steps of approximately 20 dB" should be considered a "minimum gain value" is inconsistent with the specification, the

plain meaning of the term "minimum", and the explicit teachings of Kopmeiners et al. that describe the "minimum gain" as a "***zero gain setting***" (col. 5, lines 41-44). Hence, one skilled in the art would never consider the disclosed ***adjustment*** of the gain signal, *either downward or upward* ***in steps of approximately 20dB*** as a teaching of "setting the gain to a ***minimum gain value***", as claimed.

Further, the Examiner has failed to establish any rational basis to establish that the claimed "minimum gain value" should be so broadly construed as to encompass the disclosed decrementing of gain by 20dB in Kopmeiners et al.

Hence, Kopmeiners et al. provides no disclosure or suggestion of "determining the optimum gain for the received wireless signal based on setting the gain to a minimum gain value", and any assertions by the Examiner to the contrary are insufficient to overcome the deficiencies in the applied reference. "A prior art patent is a reference only for that which it teaches." *Corning Glass v. Sumitomo Electric*, 9 USPQ2d 1962, 1970 (Fed. Cir. 1989).

Hence, the rejection should be withdrawn because it fails to demonstrate that the applied reference discloses each and every element of the claim. It is not sufficient that a single prior art reference discloses each element that is claimed, but the reference also must disclose that the elements are arranged as in the claims under review. *In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990) (citing *Lindemann Maschinenfabrik GmbH*).

Conclusion

For the reasons set forth above, it is clear that Appellant's independent claims 1 and 4 are patentable over the reference applied. Accordingly the appealed claims 1-7 should be deemed patentable over the applied reference. It is respectfully requested that this appeal be granted and that the Examiner's rejections be reversed.

To the extent necessary, Appellant petitions for an extension of time under 37 C.F.R. 1.136 and 37 C.F.R. 41.37(e). Please charge any shortage in fees due in connection with the filing of this paper, including any missing or insufficient fees under 37 C.F.R. 1.17(a) or 41.20(b)(2), to Deposit Account No. 50-0687, under Order No. 95-535, and please credit any excess fees to such deposit account.

Respectfully submitted,

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8. Claims Appendix

1. (ORIGINAL) A method in a wireless transceiver, the method including:

setting a gain to an initial gain value for mapping a received wireless signal to a first power value for supply of the received wireless signal to an input circuit having a prescribed input range;

amplifying the received wireless signal by the initial gain value to the first power value;

if the first power value of the received wireless signal does not exceed the prescribed input range, determining an optimum gain for the received wireless signal relative to the initial gain value and the first power value;

if the first power value of the received wireless signal exceeds the prescribed input range, determining the optimum gain for the received wireless signal based on setting the gain to a minimum gain value; and

outputting the received wireless signal at the optimum gain.

2. (ORIGINAL) The method of claim 1, wherein the setting step includes:

setting the initial gain value based on a dynamic range of the wireless transceiver and based on a prescribed signal to noise ratio.

3. (ORIGINAL) The method of claim 2, wherein the dynamic range includes a maximum analog gain supplied by an analog front end amplifier, and a maximum range for the gain.

4. (ORIGINAL) A wireless transceiver including:

input circuit having a prescribed input range; and

a digital gain controller configured for amplifying a received wireless signal to an optimum gain value for the prescribed input range by:

(1) setting a gain to an initial gain value for mapping the received wireless signal to a first

power value for supply of the received wireless signal to the input circuit,

(2) amplifying the received wireless signal by the initial gain value to the first power value,

(3) if the first power value of the received wireless signal does not exceed the prescribed input range, determining an optimum gain for the received wireless signal relative to the initial gain value and the first power value, and

(4) if the first power value of the received wireless signal exceeds the prescribed input range, determining the optimum gain for the received wireless signal based on setting the gain to a minimum gain value.

5. (ORIGINAL) The wireless transceiver of claim 4, wherein the digital gain controller is configured for setting the initial gain value based on a dynamic range of the wireless transceiver and based on a prescribed signal to noise ratio.

6. (ORIGINAL) The wireless transceiver of claim 5, further comprising an analog front end amplifier configured for amplifying the received wireless signal by up to a maximum analog gain and outputting the received wireless signal to the digital gain controller, wherein the dynamic range includes the maximum analog gain and a maximum range for the gain.

7. (ORIGINAL) The wireless transceiver of claim 6, wherein the wireless transceiver is configured as an Orthogonal Frequency Division Multiplexing (OFDM) receiver configured for receiving the received wireless signal according to IEEE 802.11a protocol.

9. <u>Evidence Appendix</u>

[No evidence attached]

10. Related Proceedings Appendix

[No Related Proceedings]